Sandia National Laboratories/New Mexico

PROPOSAL FOR NO FURTHER ACTION ENVIRONMENTAL RESTORATION PROJECT SITE 141, BUILDING 9967 SEPTIC SYSTEM OPERABLE UNIT 1295

June 1996

Environmental Restoration Project

United States Department of Energy
Albuquerque Operations Office

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ENVIRONMENTAL RESTORATION PROJECT

SITE 141, BUILDING 9967 SEPTIC SYSTEM
OPERABLE UNIT 1295
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Department of Energy

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1. INTRODUCTION

1.1 ER Site 141, Building 9967 Septic System

Sandia National Laboratories/New Mexico (SNL/NM) is proposing a no further action (NFA) decision based on confirmatory sampling for Environmental Restoration (ER) Site 141, Building 9967 Septic System, Operable Unit (OU) 1295. ER Site 141 is listed in the Hazardous and Solid Waste Amendment (HSWA) Module IV (EPA August 1993) of the SNL/NM Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Facility Permit (NM5890110518-1) (EPA August 1992).

1.2 SNL/NM Administrative NFA Process

This proposal for a determination of a NFA decision based on confirmatory sampling was prepared using the criteria presented in Section 4.5.3 of the SNL/NM Program Implementation Plan (PIP) (SNL/NM February 1995). Specifically, this proposal "must contain information demonstrating that there are no releases of hazardous waste (including hazardous constituents) from solid waste management units (SWMU) at the facility that may pose a threat to human health or the environment" (as proposed in 40 CFR 264.514[a] [2]) (EPA July 1990). The HSWA Module IV contains the same requirements for an NFA demonstration:

> "Based on the results of the RFI [RCRA Facility Investigation] and other relevant information, the Permittee may submit an application to the Administrative Authority for a Class III permit modification under 40 CFR 270.42(c) to terminate the RFI/CMS [corrective measures study] process for a specific unit. This permit modification application must contain information demonstrating that there are no releases of hazardous waste including hazardous constituents from a particular SWMU at the facility that pose threats to human health and/or the environment, as well as additional information required in 40 CFR 270.42(c) (EPA August 1993)."

If the available archival evidence is not considered convincing, SNL/NM performs confirmatory sampling to increase the weight of the evidence and allow an informed decision on whether to proceed with the administrative-type NFA or to return to the site characterization program for additional data collection (SNL/NM February 1995).

The Environmental Protection Agency (EPA) acknowledged that the extent of sampling required may vary greatly, stating that:

> the agency does not intend this rule [the second codification of HSWA] to require extensive sampling and monitoring at every SWMU. . . . Sampling is generally required only in situations where there is insufficient evidence on which to make an initial release determination. . . . The actual extent of sampling will vary . . . depending on the amount and quality of existing information available (EPA December 1987).

This request for an NFA decision for ER Site 141 is based primarily on results of a passive soil-gas survey (NERI June 1995) and analytical results of confirmatory soil samples collected at the site. Concentrations of site-specific constituents of concern (COCs) detected in the soil samples were first compared to background 95th percentile or upper tolerance limit (UTL) concentrations of COCs found in SNL/NM soils (IT March 1996) or other relevant background limits. If no SNL/NM background limit was available for a particular COC, or if the COC concentration exceeded the SNL/NM or other relevant background limit, then the constituent concentration was compared to the proposed 40 CFR Part 264 Subpart S (Subpart S) or other relevant soil action level for the compound (EPA July 1990). If the COC concentration exceeded both the background limit and relevant action level for that compound, or if no background limit or action level has been determined or proposed for the constituent, then a risk assessment was performed. The highest concentration of the particular COC identified at the site was then compared to the derived risk assessment action level to determine if the COC concentration at the site poses a significant health risk.

A site is eligible for an NFA proposal if it meets one or more of the following criteria presented in the Environmental Restoration Document of Understanding (NMED, November 1995):

- NFA Criterion 1: The site cannot be located or has been found not to exist, is a duplicate potential release site (PRS) or is located within and therefore, investigated as part of another PRS.

- NFA Criterion 2: The site has never been used for the management (that is, generation, treatment, storage, or disposal) of RCRA solid or hazardous wastes and/or constituents or other CERCLA hazardous substances.

- NFA Criterion 3: No release to the environment has occurred, nor is likely to occur in the future.

- NFA Criterion 4: There was a release, but the site was characterized and/or remediated under another authority which adequately addresses corrective action, and documentation, such as a closure letter, is available.

- NFA Criterion 5: The PRS has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use.

Review and analysis of the ER Site 141 soil sample analytical data indicate that concentrations of COCs detected in soils at this site are less than (1) SNL/NM or other applicable background concentrations, or (2) proposed Subpart S or other action levels, or (3) derived risk assessment action levels. Thus ER Site 141 is being proposed for an NFA decision based on confirmatory sampling data demonstrating that hazardous waste or COCs that may have been released from this SWMU into the environment pose an acceptable level of risk under current and projected future land use (Criterion 5).

1.3 Local Setting

SNL/NM occupies 2,829 acres of land owned by the Department of Energy (DOE), with an additional 14,920 acres of land provided by land-use permits with Kirtland Air Force Base (KAFB), the United States Forest Service (USFS), the State of New Mexico, and the Isleta Indian Reservation. SNL/NM has been involved in nuclear weapons research, component development, assembly, testing, and other research and development activities since 1945 (DOE September 1987).

ER Site 141 is located on KAFB in an area of SNL/NM's Coyote Test Field known as Thunder Range. The site is located approximately 1.2 miles north of the Isleta Reservation boundary and 0.8 miles west of the Solar Power Tower, a prominent landmark in the area. The site is accessed by traveling west from Lovelace Road on Magazine Road for a distance of 1.8 miles, and then southeast about 0.3 miles on a paved and then a dirt road that serves a portion of Thunder Range (Figure 1-1). ER Site 141 itself is situated on the west side of Building 9967, a high explosives assembly building (Figure 1-2). The area immediately around the two potential release points at this site encompasses approximately 0.02 acres of land that slopes very gently to the southwest, and lies at an average elevation of 5,502 feet above mean sea level (AMSL).

The surficial geology at ER Site 141 is characterized by a veneer of aeolian sediments that are underlain by alluvial fan or alluvial deposits. Based on drilling records of similar deposits at KAFB, the alluvial materials are highly heterogeneous, composed primarily of medium to fine silty sands with frequent coarse sand, gravel, and cobble lenses. The alluvial deposits probably extend to the water table. Vegetation consists predominantly of grasses, including gramma, muhly, dropseed, and galleta. Shrubs commonly associated with the grasslands include sand sage, winter fat, saltbrush, and rabbitbush. Cacti are common, and include cholla, pincushion, strawberry, and prickly pear (SNL/NM March 1993).

The water-table elevation is approximately 5,315 feet AMSL at this location, so depth to water at this site is approximately 187 feet. Local groundwater flow is believed to be in a generally northwest direction in the vicinity of this site (SNL/NM March 1995). The nearest wells to the site are a group of Chemical Waste Landfill ground-water monitoring wells which are located approximately 4,000 feet northwest of Site 141 in the southeast corner of TA III. The nearest production wells are northwest of the site and include KAFB-2, KAFB-4, and KAFB-7 which are approximately 5.2 to 6.4 miles away (SNL/NM October 1995).

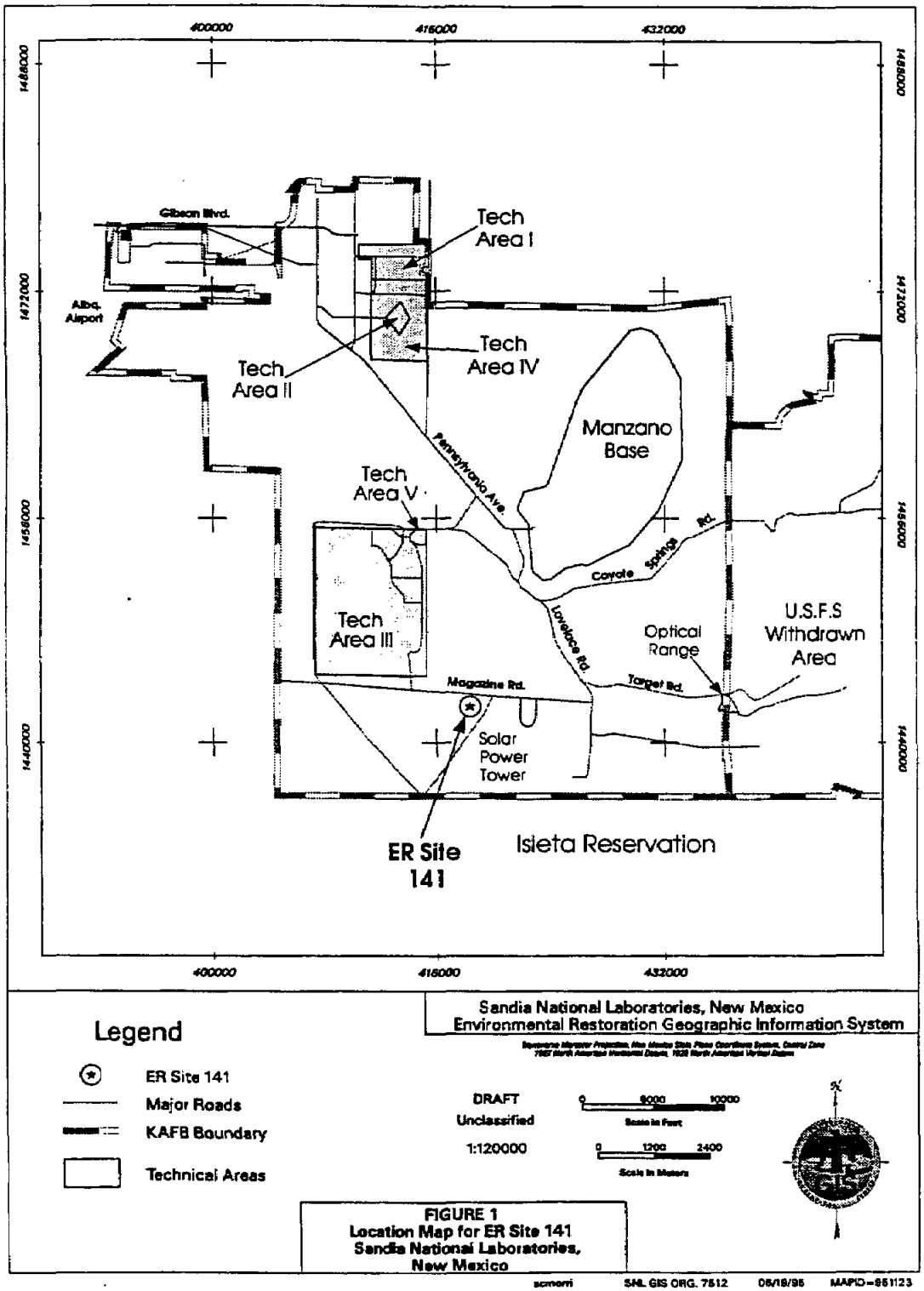

Figure 1-1: ER Site 141 Location Map

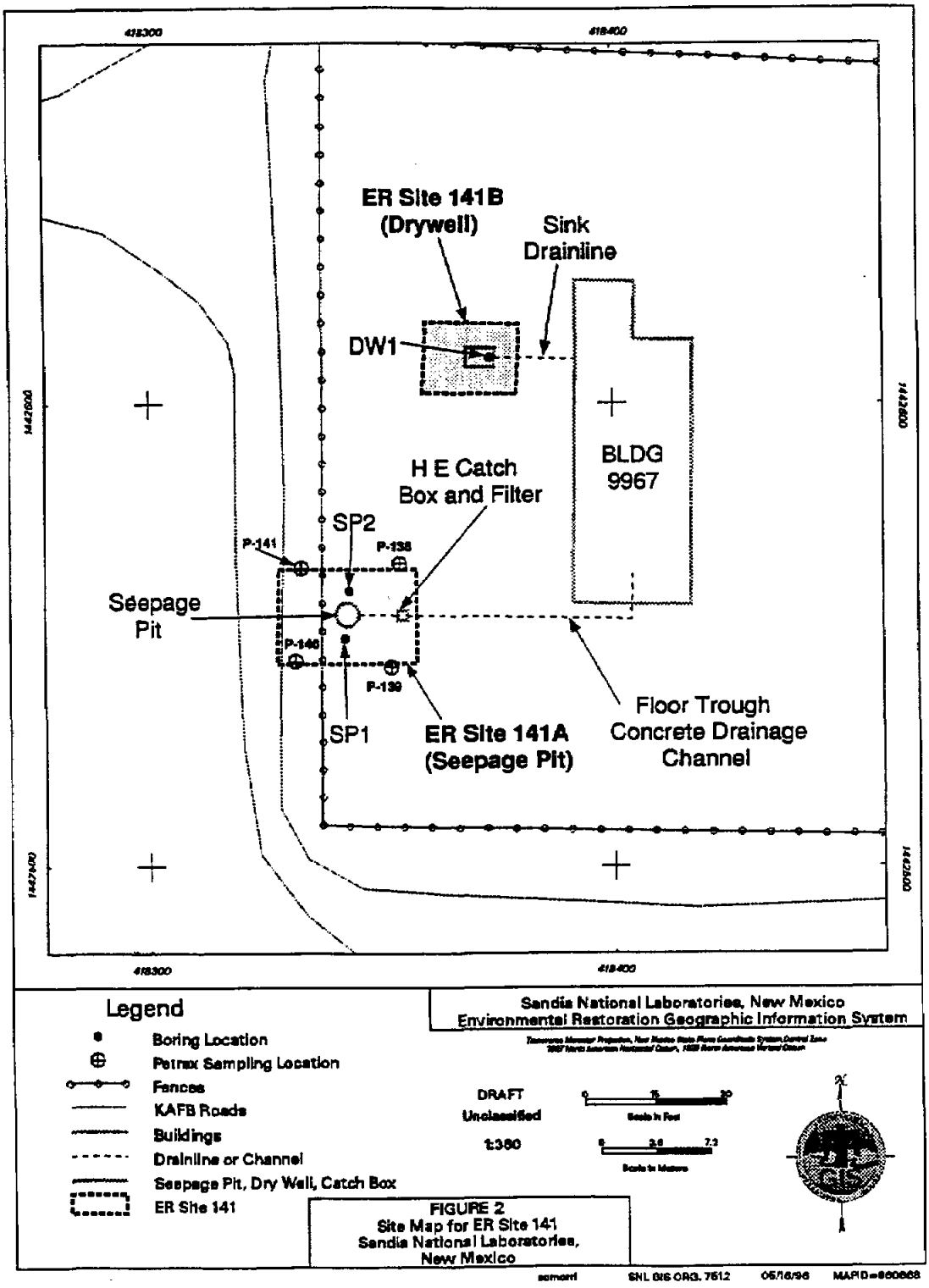

Figure 1-2: ER Site 141 Site Map

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2. HISTORY OF THE SWMU

2.1 Sources of Supporting Information

In preparing the confirmatory sampling NFA proposal for ER Site 141, available background information was reviewed to quantify potential releases and to select analytes for the soil sampling. Background information was collected from SNL/NM Facilities Engineering drawings and interviews with employees familiar with site operational history. The following sources of information, hierarchically listed with respect to assigned validity, were used to evaluate ER Site 141:

- Confirmatory subsurface exploration and soil sampling conducted in September 1994 and January 1995 (SNL/NM September 1994a and b, and January 1995a, b, and c);
- Two survey reports, including data from a geophysical survey (Lamb 1994), and a passive soil-gas survey (NERI June 1995);
- RCRA Facility Investigation Work Plan for OU 1295, Septic Tanks and Drainfields (SNL/NM March 1993);
- Photographs and field notes collected by SNL/NM ER staff at ER Site 141;
- SNL/NM Facilities Engineering drawings (SNL/NM March 1968);
- SNL/NM Geographic Information System (GIS) data; and
- The RCRA Facility Assessment (RFA) report (EPA April 1987).

2.2 Previous Audits, Inspections, and Findings

ER Site 141 was first listed as a potential release site in the RFA report to the EPA in 1987 (EPA April 1987). This report contained a generic statement about this and many other SNL/NM septic systems, and indicated that sanitary and industrial wastes may have been discharged to septic tanks and drainfields during past operations. This SWMU was included in the RFA report as Site number 79, along with several other septic and drain systems at SNL/NM. All the sites included in Site 79 are now designated by individual SWMU numbers.

2.3 Historical Operations

The following historical and site operational and physical information is based on a number of references and information sources, including IT March 1994, SNL/NM March 1968, March 1993, September 1994a and January 1995a.

ER Site 141 includes the Bldg. 9967 high explosive (HE) seepage pit and another small draining unit described as a French drain in the RFI Work Plan (SNL/NM March 1993)(Figure 2-2). This unit will be referred to as the "drywell" in the remainder of this report. Building 9967, also known as the High Explosives Assembly Building, was constructed in 1968 and was used for assembling HE for explosive testing.

A partial list of explosive compounds used at the facility include nitroguanidine in powder form, ammonium nitrate, Composition C4, PBX-9404, PBX-9205, and pentaerythritol tetranitrate (PETN).

The building is furnished with one hand-washing sink and a floor trough. The sink is located in the northwest corner of the explosive assembly room and discharged to the drywell on the west side of the building. In January 1995, a backhoe was used to determine the exact location and dimensions of this drywell. It was found to consist of a four-foot wide by six-foot long by 1.5-foot thick layer of 2-inch gravel buried from 0.5 to 2 feet below grade. The sink drainline was found to consist of a four-inch diameter cast iron pipe buried six inches below grade. The drainline exits on the west side of Building 9967, runs in a westerly direction for a distance of eighteen feet, and terminates on the east side of the drywell (Figure 1-2).

The floor trough discharged through a concrete channel with a steel cover, which exits at the south end of the building and turns west to a catch box that was lined with a polyethylene filter bag. During washing activities, heavy particles of waste HE were collected in the polyethylene filter bag, and the liquid overflow discharged into the seepage pit. The filter bags were periodically replaced and disposed of by U.S. Air Force explosive ordnance disposal (EOD) personnel. During past operations, the floor in the explosive assembly area was washed down with water into the floor trough. Building 9967 is presently used only intermittently. When necessary, the floors are swept and wet-mopped rather than washed down into the floor trough.

SNL/NM Facility Engineering drawings, field observations, and measurements indicate that the seepage pit consists of a corrugated metal culvert pipe five feet in diameter and six feet long that is buried in a vertical position. The corrugated pipe rests on a three-foot thick layer of gravel, which would place the effluent release point at nine feet below grade.

3. EVALUATION OF RELEVANT EVIDENCE

3.1 Unit Characteristics

There are no safeguards inherent in the drain system from Building 9967 or in facility operations that could have prevented past releases to the environment.

3.2 Operating Practices

As discussed in Section 2.3, release of HE particles to the catch box filter bag was standard procedure while the building was occupied. Hazardous wastes were not managed or contained at ER Site 141.

3.3 Presence or Absence of Visual Evidence

No visible evidence of soil discoloration, staining, or odors indicating residual contamination was observed when soil samples were collected adjacent to the seepage pit in the fall of 1994 (SNL/NM September 1994a), or when soil around and beneath the drywell was partially excavated and then sampled in January 1995 (SNL/NM January 1995a and 1995b).

3.4 Results of Previous Sampling/Surveys

A surface radiological survey was not conducted at the site because there is no previous history or evidence of any testing or assembly involving radiological materials performed outside of Building 9967.

A geophysical survey performed at the site in March 1994 was intended to identify any subsurface areas with high moisture content, indicating a possible contaminant plume from past releases. The results of the geophysical survey were inconclusive, with no definitive indications of high moisture concentrations (Lamb 1994). Therefore, the geophysical survey results were not used as a guide in the soil sampling effort.

A passive soil-gas survey conducted at the site in May and June 1994 utilized PETREX™ sampling tubes to identify any releases of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) to the soil around the septic tank and seepage pit (SNL/NM May and June 1994). The PETREX™ tube soil-gas survey is a semi-quantitative screening procedure that can be used to identify many volatile and semivolatile organic compounds. This technique may be used to guide VOC and SVOC site investigations. The advantages of this sampling methodology are that large areas can be surveyed at relatively low cost, the technique is highly sensitive to organic vapors, and the result produces a measure of soil vapor chemistry over a two- to three-week period rather than at one point in time. Each PETREX™ soil-gas sampler consists of two activated charcoal-coated wires housed in a reusable glass test tube container. At each sampling location, sample tubes are buried in an inverted position so that the mouth of the sampler is about one foot below grade. Samplers are left in place for a two-to three-week period, and are then removed from the ground and sent to the manufacturer, Northeast Research Institute (NERI), for analysis using thermal desorption-gas chromatography/mass spectrometry.

The analytical laboratory reports all sample results in terms of "ion counts" instead of concentrations, and identifies those samples that contain compounds above the PETREX™ technique detection limits. NERI considers a "hit" for individual compounds (such as perchloroethene [PCE] or trichloroethene[TCE]) to be greater than 100,000 ion counts, and 200,000 ion counts for mixtures of compounds (BTEX or aliphatics, for example) (NERI June 1995).

PETREX™ tubes were placed at four locations around the seepage pit at this site (Figure 1-2). The analytical results of the ER Site 141 passive soil-gas survey are presented in Appendix A.1 and indicate that no VOCs or SVOCs were detected in soils at ER Site 141 (NERI June 1995).

3.5 Assessment of Gaps in Information

Process knowledge and other available information regarding Building 9967 activities were used to help identify the most likely COCs that might be found in soils surrounding the seepage pit and drywell, and to help select the types of analyses to be performed on soil samples collected from the site. While the history of past releases at the site is incomplete, analytical data from the confirmatory soil samples collected in September 1994 and January 1995 (discussed below) are sufficient to determine whether releases of COCs occurred at the site.

3.6 Confirmatory Sampling

Although the likelihood of hazardous waste releases at ER Site 141 was considered low, confirmatory soil sampling was conducted immediately adjacent to the seepage pit and near the sink drainline discharge in order to determine whether COCs above background or detectable levels had been released to the environment at this site. The confirmatory soil sampling program was performed in accordance with the rationale and procedures described in the Septic Tank and Drainfields (ADS-1295) RCRA Facility Investigation Work Plan (SNL/NM March 1993), and addenda to the Work Plan developed during the OU 1295 project approval process (IT March 1994 and SNL/NM November 1994).

A summary of the types of samples, number of sample locations, sample depths and analytical requirements for confirmatory soil samples collected at this site is presented in the following table.

Table 3-1
ER Site 141: Confirmatory Sampling Summary Table

Sampling Location	Analytical Parameters	Number of Borehole Locns.	Top of Sampling Interval at Each Boring Location	Total Number of Field Samples	Total Number Duplicate Samples	Date(s) Samples Collected
Seepage pit	VOCs	2	9', 19'	4	1	9/27-28/94
	SVOCs	2	9', 19'	4	1	
	RCRA metals	2	9', 19'	4	1	
	TNT screen	2	9', 19'	4	1	
	Isotopic uranium compos.	2	9', 19'	2		
	Gamma spec. compos.	2	9', 19'	2		
Drywell	VOCs	2	2', 12'	2		1/10/95
	SVOCs	2	2', 12'	2		
	RCRA metals	2	2', 12'	2		
	TNT screen	2	2', 12'	2		
	Isotopic uranium	2	2', 12'	2		
	Gamma spectroscopy	2	2', 12'	2		
	Tritium	2	2', 12'	2		

Notes
Locns. = Locations
RCRA = Resource Conservation and Recovery Act
SVOCs = Semivolatile organic compounds
Spec. = Spectroscopy
TNT = Trinitrotoluene
VOCs = Volatile organic compound

Soil samples were collected from one boring on either side of the seepage pit, and from a single boring in the drywell that was located one foot from the terminus of the sink drain pipe. The photograph in Figure 3-1 shows the seepage pit cover, and the soil sampling activities on the north side of that unit. The drywell boring was drilled through the 1.5-foot thick gravel layer so soil directly beneath the drain pipe discharge point could be sampled. The boring locations at this site are shown on Figure 1-2.

Soil samples were collected from two intervals in each of the seepage pit boreholes. The upper (shallow) interval started at the bottom of the unit (9 feet below grade), and the lower (deeper) interval started at 10 feet below the top of the upper sampling interval (19 feet below grade) (SNL/NM September 1994a). Two depth intervals were also sampled in the single drywell boring, the first starting at the bottom of the drywell (2 feet below grade), and the second, 10 feet below the top of the first sampling interval (12 feet below grade)(SNL/NM January 1995b).

Depths below grade to the bottoms of the seepage pit and drywell were determined based on field measurements and SNL/NM Facilities Engineering drawings (SNL/NM March 1968).

Collecting soil samples on the north side of the seepage pit with the Geoprobe. View looking northwest.

Figure 3-1: ER Site 141 photograph

The Geoprobe™ sampling system was used to collect subsurface soil samples at this site. The Geoprobe™ sampling tool was fitted with a butyl acetate (BA) sampling sleeve and was then hydraulically driven to the top of the designated sampling depth. The sampling tool was opened, and driven an additional two feet in order to fill the two-foot long by approximately 1.25-inch diameter BA sleeve. The sampling tool and soil-filled sleeve were then retrieved from the borehole. In order to minimize the potential for loss of volatile compounds (if present), the soil to be analyzed for VOCs was not emptied from the BA sleeve into another sample container. The filled BA sleeve was removed from the sampling tool, and the top seven inches were cut off. Both ends of the seven-inch section of filled sleeve were immediately capped with a teflon membrane and rubber end cap, sealed with tape, and placed in an ice-filled cooler at the site. The soil in this section of sleeve was submitted for a VOC analysis.

Soil from the remainder of the sleeve was then emptied into a decontaminated mixing bowl. Following this, one or two more two-foot sampling runs were then completed at each interval in order to recover enough soil to satisfy sample volume requirements for the interval. Soil recovered from these additional runs was also emptied into the mixing bowl, and blended with soil from the first sampling run. The soil was then transferred from the bowl into sample containers using a decontaminated plastic spatula, and was analyzed for SVOCs and the eight RCRA metals by laboratory analysis, and trinitrotoluene (TNT) compounds using a field screening immunoassay technique. Routine SNL/NM chain-of-custody and sample documentation procedures were employed. Samples were shipped to the laboratory by an overnight delivery service.

To determine if radionuclides were released from past activities at this site, samples were collected from both the shallow and deep intervals in the drywell boring and were analyzed by a commercial laboratory for isotopic uranium and tritium, and were also screened for other radionuclides using SNL/NM in-house gamma spectroscopy. Composite soil samples were also collected from both the shallow and deep sampling intervals in the seepage pit borings and were submitted for isotopic uranium analyses by a commercial laboratory, and were also screened for other radionuclides using SNL/NM in-house gamma spectroscopy.

Quality assurance/quality control (QA/QC) samples collected during this effort consisted of one set of duplicate soil samples and one set of aqueous equipment samples that were analyzed for the same chemical constituents as the field samples. Also, a soil trip blank sample was included with the shipment of ER Site 141 soil samples to the laboratory and was analyzed for VOCs only. Low concentrations of acetone, 2-hexanone, methylene chloride, and toluene were detected in this soil trip blank by the laboratory. These common laboratory contaminants were either not detected or were found in generally lower concentrations in the site samples compared to the trip blank. Soil used for the trip blank was prepared by heating the material, and then transferring it immediately to the sample container. This heating process drives off any residual volatile organic compounds (if present) and soil moisture that may be contained in the material. Apparently when the soil trip blank container was opened at the laboratory, it immediately adsorbed both moisture and VOCs present in the laboratory atmosphere, and therefore became slightly contaminated.

Summaries of all constituents detected by both commercial laboratory analyses and by the SNL/NM Environmental Restoration field laboratory in the ER Site 141 confirmatory samples are presented in Tables 3-2, 3-3, and 3-4.

Table 3-2

ER Site 141
Summary of Organic and Other Constituents in Confirmatory Soil Samples
Collected Around the Seepage Pit and Beneath the Drywell

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Figure 2)	Top of Sample Interval (fbgs)	VOCs Method 8240 Acetone	1,1-DCE	2-Hexa-none	Meth. Chloride	Toluene	SVOCs Method 8270 BEHP	TNT Screen Colorimetric method based on EPA 8515	Units
Seepage Pit Soil and QA Samples:													
017933-1,2	Soil	Field	9/27/94	SP-1	9	ND	ND	ND	1.9 B,J	ND	ND	ND	ug/kg
017936-1,2	Soil	Field	9/27/94	SP-1	19	ND	ND	ND	1.9 B,J	3.9 B,J	ND	ND	ug/kg
017937-1,2	Soil	Field	9/27/94	SP-2	9	1.5 B,J	ND	ND	ND	ND	ND	ND	ug/kg
017939-1,2	Soil	Field	9/28/94	SP-2	19	ND	ND	ND	1.6 B,J	ND	ND	ND	ug/kg
017940-1,2	Soil	Dupl.	9/28/94	SPD-2	19	ND	ND	ND	1.9 B,J	ND	ND	ND	ug/kg
017938-1	Soil	TB	9/27/94	Site 141	NA	11	ND	2.4 J	2.7 B,J	1.3 J	NS	NS	ug/kg
017941-1,2	Water	EB	9/28/94	Site 141	NA	ND	3.4 J	ND	1.4 J	ND	5.7 J	NS	ug/L
Drywell Soil Samples:													
018900-1,2	Soil	Field	1/10/95	DW-1	2	9.6 J	ND	ND	1.6 J	ND	ND	ND	ug/kg
018901-1,2	Soil	Field	1/10/95	DW-1	12	6.7 J	ND	ND	1.4 J	ND	ND	ND	ug/kg
Laboratory Reporting Limit For Soil						10	5	10	5	5	330	1,000	ug/kg
Laboratory Reporting Limit For Water						10	5	10	5	5	10	NA	ug/L
Proposed Subpart S Action Level For Soil						8E+06	1E+04	None	9E+04	2E+07	5E+04	4E+04	ug/kg

Notes:

B = Compound detected in associated blank sample
BEHP = Bis(2-Ethylhexyl)phthalate
1,1-DCE = 1,1-Dichloroethylene
Dupl. = Duplicate soil sample
EB = Equipment rinsate blank
fbgs = Feet below ground surface
J = Result is detected below the reporting limit, or is an estimated concentration.
Meth. Chloride = Methylene chloride
NA = Not applicable
ND = Not detected
NS = No sample
QA = Quality assurance
SVOCs = Semivolatile organic compounds
TB = Trip Blank
TNT = Trinitrotoluene
ug/kg = Micrograms per kilogram
ug/L = Micrograms per liter
VOCS = Volatile organic compounds

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Table 3-3

ER Site 141
Summary of RCRA Metals in Confirmatory Soil Samples
Collected Around the Seepage Pit and Beneath the Drywell

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Figure 2)	Top of Sample Interval (fbgs)	RCRA Metals, Methods 6010 and 7471								Units
						As	Ba	Cd	Cr, total	Pb	Hg	Se	Ag	
Seepage Pit Soil and QA Samples:														
017933-2	Soil	Field	9/27/94	SP-1	9	3	50	ND	3.4	6.6	ND	0.5	ND	mg/kg
017936-2	Soil	Field	9/27/94	SP-1	19	3	48	ND	3.8	8	ND	0.8	ND	mg/kg
017937-2	Soil	Field	9/27/94	SP-2	9	3.2	30	ND	4.2	5.3	ND	1	ND	mg/kg
017939-2	Soil	Field	9/28/94	SP-2	19	2.4	76.6	ND	6.3	7.9	ND	1.9	ND	mg/kg
017940-2	Soil	Dupl.	9/28/94	SPD-2	19	1.7	34.2	ND	4.5	6.7	ND	ND	ND	mg/kg
017941-3	Water	EB	9/28/94	Site 141	NA	ND	0.0029 J	ND	ND	ND	ND	ND	ND	mg/L
Drywell Soil Samples:														
018900-2	Soil	Field	1/10/95	DW-1	2	4.1	103	ND	3.4	4.8 J	ND	ND	ND	mg/kg
018901-2	Soil	Field	1/10/95	DW-1	12	2.7	39	ND	2.6	5.4	ND	ND	ND	mg/kg
Laboratory Reporting Limit For Soil						1	1	0.5	1	5	0.1	0.5	1	mg/kg
Laboratory Reporting Limit For Water						0.01	0.01	0.005	0.01	0.003	0.0002	0.005	0.01	mg/L
Number of SNL/NM Background Soil Sample Analyses *						15	727	1,740	647	536	1,724	2,134	2,302	NA
SNL/NM Soil Background Range *						2.1-7.9	0.5-495	0.0027-6.2	0.5-31.4	0.75-103	0.0001-0.68	0.037-17.2	0.0016-8.7	mg/kg
SNL/NM Soil Background UTL or 95th Percentile *						7	214	0.9	15.9	11.8	<0.1	<1.0	<1.0	mg/kg
Proposed Subpart S Action Level For Soil						0.50	6,000	80	80,000 **	400 ***	20	400	400	mg/kg

Notes:
As = Arsenic. Arsenic background concentrations presented above are based on analyses of subsurface soil samples collected in the Coyote Test Field (CTF) area.
Ba = Barium. Barium background concentrations presented above are based on analyses of subsurface soil samples collected in the Southwest and CTF areas.
Cd = Cadmium. Cadmium background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF, and Offsite areas.
Cr = Chromium. Chromium background concentrations presented above are based on analyses of subsurface soil samples collected in the Southwest area.
Pb = Lead. Lead background concentrations presented above are based on analyses of subsurface samples collected in the Southwest and Offsite areas.
Hg = Mercury. Mercury background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF and Offsite areas.
Se = Selenium. Selenium background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the North, Tijeras, Southwest, CTF and Offsite areas.
Ag = Silver. Silver background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF, and Offsite areas.

CTF = Coyote Test Field
Dupl. = Duplicate soil sample
EB = Equipment rinsate blank
fbgs = Feet below ground surface
J = Result is detected below the reporting limit or is an estimated concentration.
mg/kg = Milligrams per kilogram
mg/L = Milligrams per liter
NA = Not applicable
ND = Not detected
NS = No sample
QA = Quality assurance
UTL = Upper Tolerance Limit
* IT March 1996
** 80,000 mg/kg is for Cr^{3+} only. For Cr^{6+}, proposed Subpart S action level is 400 mg/kg.
*** No proposed Subpart S action level for lead in soil, 400 ppm is EPA proposed action level (EPA July 1994)

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Table 3-4

ER Site 141
Summary of Isotopic Uranium and Tritium in Confirmatory Soil Samples Collected From Around the Seepage Pit and Drywell

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Figure 2)	Top of Sample Interval (fbgs)	Isotopic Uranium Method EPI A-011B for seepage pit soil samples Method HASL-300 for the drywell samples (pCi/g) U-233/ U-234 Result	U-233/ U-234 Error *	U-233/ U-234 M.D.A.	U-235 Result	U-235 Error *	U-235 M.D.A.	U-238 Result	U-238 Error *	U-238 M.D.A.	Tritium Method EPA-600 906.0 (pCi/L) Result	Error *	M.D.A.
Seepage Pit Composite Soil Samples:																	
023860-1	Soil	Composite	9/27/94	SP-1/2	9	0.81	0.121	0.09	0.037 J	0.023	0.09	0.731	0.113	0.09			
023861-1	Soil	Composite	9/27/94	SP-1/2	19	0.808	0.123	0.09	0.037 J	0.023	0.09	0.819	0.125	0.09			
Drywell Soil Samples:																	
018900-4,5	Soil	Field	1/10/95	DW-1	2	0.7	0.17	0.053	0.022	0.026	0.02	0.65	0.16	0.062	290	170	270
018901-4,5	Soil	Field	1/10/95	DW-1	12	1.3	0.19	0.058	0.038	0.028	0.034	1.1	0.17	0.037	ND	150	250
Number of SNL/NM Background Soil Sample Analyses **						14			283			90			U		
SNL/NM Soil Background Range **						0.44-<5.02			0.004-3			0.153-2.3			U		
SNL/NM Soil Background 95th Percentile **						<5.02			0.16			1.4			U		
Nationwide Tritium Range in Precipation and Drinking Water ***						NA			NA			NA			100-400		

Notes:

U-233 = Uranium 233

U-234 = Uranium 234. Uranium 233/234 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

U-235 = Uranium 235. Uranium 235 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

U-238 = Uranium 238. Uranium 238 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

CTF = Coyote Test Field
fbgs = Feet below ground surface
M.D.A. = Minimum detectable activity
NA = Not applicable
ND = Not detected

pCi/g = Picocuries per gram
pCi/L = Picocuries per liter
U = Undefined for SNL/NM soils
* Error = +- 2 sigma uncertainty
** IT March 1996
*** EPA October 1993

C:\word6\nfa_docs\tables\S141rad.xls

Results of the SNL/NM in-house gamma spectroscopy composite soil sample screening for other radionuclides are presented in Appendices A.2 through A.5. Complete analytical data packages are archived in the Environmental Operations Records Center and are readily available for review and verification (SNL/NM September 1994b and January 1995c).

3.7 Rationale for Pursuing a Confirmatory Sampling NFA Decision

The passive soil-gas survey did not indicate any anomalies or areas of VOC or SVOC contamination in soils at ER Site 141.

Confirmatory soil sampling at the points of discharge around the seepage pit and drywell did not identify any residual COCs that indicate past discharges from these units that could pose a threat to human health or the environment. The five VOC compounds (acetone, 1,1-dichloroethene [1,1-DCE], 2-hexanone, methylene chloride, and toluene) that were detected in the seepage pit or drywell soil samples were identified only at below-reporting-limit concentrations, and are common laboratory contaminants (Table 3-2). As shown in Table 3-2, no SVOC constituents or trinitrotoluene (TNT) were identified in these soil samples. Soil sample analytical results indicate that, except for selenium, the eight RCRA metals that were targeted in the Site 141 investigation were either not detected, or were detected in concentrations below the background UTL or 95th percentile concentrations of those metals presented in the SNL/NM study of naturally-occurring constituents (IT March 1996) (Table 3-3). In SP-2 the concentration of selenium is above the background UTL or 95th percentile but its value of 1.9 mg/kg is well below the Subpart S soil action level of 400 mg/kg.

Isotopic uranium activity levels that were detected in the individual or composite soil samples from around the seepage pit and drywell were found to be less than the 95th percentile background activity levels for SNL/NM soils presented in the IT March 1996 report for those radionuclides (Table 3-4).

Individual soil samples were collected from both the shallow and deep drywell sampling intervals and were submitted for tritium analyses. Tritium was not detected in soil moisture from the deep interval sample, and was detected at an activity level of 290 picocuries per liter (pCi/L) in soil moisture from the shallow interval sample. This concentration was just above the tritium detection limit of 270 pCi/L for that sample. Naturally occurring tritium activity levels were not determined in the SNL/NM background study. Tritium levels detected in soil moisture from this site were therefore compared to and were found to be within the naturally-occurring tritium activity range of 100 to 300 pCi/L found in precipitation samples collected from locations throughout the U.S., and 100 to 400 pCi/L in drinking water samples collected from locations around the country (EPA October 1993). The soil moisture contained in shallow soil samples such as these represents either infiltrated precipitation, or water discharged from the Building 9921 sink to the drywell. It is therefore appropriate to compare the tritium activity level detected in the sample soil moisture to naturally-occurring tritium levels found in precipitation or drinking water samples. This comparison indicates that tritium is not present above natural background levels in soil moisture beneath the drywell at this site. Finally, the gamma spectroscopy semi-qualitative screening of composite soil samples collected from the seepage pit and drywell shallow and deep sampling intervals did not indicate the presence of contamination from other radionuclides in soils at this site (Appendices A.2 through A.5).

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4. CONCLUSION

Sample analytical results generated from this confirmatory sampling investigation have shown that detectable or significant concentrations of COCs are not present in soils at ER Site 141, and that additional investigations are unwarranted and unnecessary. Based on archival information and chemical and radiological analytical results of soil samples collected at the likely points of release of effluent from the Building 9967 septic system, SNL/NM has demonstrated that any contaminants present at this site pose an acceptable level of risk under current and projected future land use (Criterion 5 of Section 1.2). Therefore, ER Site 141 is recommended for a NFA determination.

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October 13, 2003

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